

AMENDMENTS TO THE CLAIMS

Please amend claims 1, 12, 20, 22-30, 32, 35 and 37-39.

1. (Currently Amended) A method for exchanging data messages between a first Intellectual Property electronic circuit building block having a first signaling protocol for exchanging messages and a second Intellectual Property electronic circuit building block having a second signaling protocol for exchanging messages, the first signaling protocol including a data type having a first structure, the second signaling protocol including a data type having a second structure different than the first structure, the method comprising:

receiving a first representation, representing the first signaling protocol of said first Intellectual Property building block, said first representation using regular expressions;

receiving a second representation, representing the second signaling protocol of said second Intellectual Property building block, said second representation using regular expressions;

generating a first finite automaton for said first representation;

generating a second finite automaton for said second representation; and

automatically synthesizing an interface between the structurally different first and second signaling protocols of the first and second Intellectual Property electronic circuit building blocks based on the first and second finite automatons, without manually entering the interface behavior.

2. (Previously Presented) The method of claim 1, further comprising:

automatically corresponding data from said structurally different first and second protocols.

3. (Previously Presented) The method of claim 2, further comprising:

automatically translating data between said first protocol to said second protocol, said data in said first protocol having a first sequence, said data in said second protocol having a second sequence that is different from said first sequence.

4. (Previously Presented) The method of claim 2, wherein said generating a first finite automaton comprises:

- identifying the initial state of the first protocol;
- identifying a first sequence of data according to the first protocol;
- constructing derivatives of regular expressions; and
- eliminating equivalent expressions.

5. (Previously Presented) The method of claim 4, wherein said identifying a first sequence of data comprises:

- collecting data that is transferred during one or more transitions; and
- integrating said data with previous transitions.

6. (Previously Presented) The method of claim 5, further comprising:

- automatically translating data between said first protocol to said second protocol, said data in said first protocol having the first sequence, said data in said second protocol having a second sequence that is different from said first sequence.

7. (Previously Presented) The method of claim 1, further comprising:

- automatically translating data between said first protocol to said second protocol, said data in said first protocol having a first sequence, said data in said second protocol having a second sequence that is different from said first sequence.

8. (Previously Amended) The method of claim 21, wherein automatically generating a third representation comprises:

- (a) selecting the interface state representing a first finite automaton state and a second finite automaton state;
- (b) identifying all outgoing transitions in said selected state;
- (c) determining a new state for each outgoing transition; and
- (d) repeating steps (a)-(c) for each interface state.

9. (Previously Presented) The method of claim 8, wherein generating a third representation comprises:

identifying said permitted operations as operations that do not result in a data inconsistency.

10. (Previously Amended) The method of claim 8, further comprising:

identifying non-deterministic transitions for each interface state; and
selecting a single outgoing transition for each interface state for each input value based upon priority parameters to generate a deterministic interface between the first and second protocols.

11. (Previously Presented) The method of claim 1, wherein said generating a first finite automaton comprises:

identifying the initial state of the first protocol;
identifying a first sequence of data according to the first protocol;
constructing derivatives of regular expressions; and
eliminating equivalent expressions.

12. (Currently Amended) A computer based system for exchanging data messages between a first Intellectual Property electronic circuit building block having a first signaling protocol for exchanging messages and a second Intellectual Property electronic circuit building block having a second signaling protocol for exchanging messages, the first signaling protocol including a data type having a first structure, the second signaling protocol including a data type having a second structure different than the first structure, the system comprising:

a storage device to store data and sequences of operations;

a processor to receive signals from said storage device and to execute said sequences of operations;

a receiving unit to transmit signals to said processor and to receive a first and second representation, representing the first and second protocols of respective first and second Intellectual Property building blocks, said first and second representations using regular expressions;

an automata unit to generate a first finite automaton for said first representation and to generate a second finite automaton for said second representation; and

a synthesizing unit to automatically synthesize an interface between the structurally different first and second signaling protocols of the first and second Intellectual Property electronic circuit building blocks based on the first and second finite automata, without manually entering the interface behavior.

13. (Previously Presented) The system of claim 12, further comprising:

a corresponding unit to receive signals from said processor and to automatically correspond data from said first and said second protocol, wherein said first protocol and said second protocol are structurally different

14. (Previously Presented) The system of claim 13, further comprising:

a translation unit to automatically translate data between said first protocol and said second protocol, said data in said first protocol having a first sequence, said data in said second protocol having a second sequence that is different from said first sequence.

15. (Previously Presented) The system of claim 13, wherein said automata unit comprises:

16. (Previously Presented) The system of claim 15, wherein said second identifying unit comprises:

a data collection unit to collect data that is transferred as one or more transitions;

and

a data analyzer to integrate said data with previous transitions.

17. (Previously Presented) The system of claim 12, further comprising:

a translation unit to automatically translate data between said first protocol and said second protocol, said data in said first protocol having a first sequence, said data in said second protocol having a second sequence that is different from said first sequence.

18. (Previously Amended) The system of claim 12, wherein the product unit comprises:

a selection unit to select an interface state representing a first finite automaton state and a second finite automaton state;

an identifying unit to identify outgoing transitions in said selected state; and

a state unit to determine a new state for each outgoing transition;

19. (Previously Presented) The system of claim 18, wherein the product unit further comprises:

a consistency unit to identify said permitted operations as operations that do not result in a data inconsistency.

20. (Currently Amended) A computer readable medium storing instructions which, when executed by a processing system, cause the system to perform a method for exchanging data messages between a first Intellectual Property ~~electronic circuit~~ building block having a first signaling protocol for exchanging messages and a second Intellectual Property ~~electronic circuit~~ building block having a second signaling protocol for exchanging messages, the method comprising:

- receiving a first representation of the first signaling protocol of the first Intellectual Property ~~electronic circuit~~ building block;
- receiving a second representation of the second signaling protocol of the second Intellectual Property ~~electronic circuit~~ building block;
- generating a first finite automaton for said first representation;
- generating a second finite automaton for said second representation;
- automatically generating a third representation of one or more permitted operations of said first and second finite automata, without manually entering the third representation behavior; and
- automatically eliminating non-determinisms in said third representation.

21. (Previously Presented) The method of claim 1, further comprising:

- automatically generating a third representation, representing one or more permitted operations of said first and second finite automata.

22. (Currently Amended) A method for exchanging data messages between a first Intellectual Property electronic circuit building block having a first signaling protocol and a second Intellectual Property electronic circuit building block having a second signaling protocol, the method comprising:

generating a first finite automaton corresponding to the first signaling protocol of the first Intellectual Property electronic circuit building block;

generating a second finite automaton corresponding to the second signaling protocol of the second Intellectual Property electronic circuit building block;

automatically generating a representation of one or more permitted operations of the first and second finite automata; and

automatically eliminating at least one non-determinism in the representation.

23. (Currently Amended) The method of claim 1, further comprising separating communication aspects and behavioral aspects of the first and second Intellectual Property electronic circuit building blocks, thereby abstracting the respective first and second protocols.

24. (Currently Amended) The ~~method-system~~ of claim 12, further comprising separating communication aspects and behavioral aspects of the first and second Intellectual Property electronic circuit building blocks, thereby abstracting the respective first and second protocols.

25. (Currently Amended) The method of claim 20, further comprising separating communication aspects of the first and second Intellectual Property electronic circuit building blocks and the behavioral aspects of the first and second Intellectual Property electronic circuit building blocks, thereby abstracting the respective first and second protocols.

26. (Currently Amended) The method of claim 22, further comprising separating communication aspects and behavioral aspects of the first and second Intellectual Property electronic circuit building blocks, thereby abstracting the respective first and second protocols.

27. (Currently Amended) The method of claim 1, the first and second Intellectual Property ~~electronic circuit~~ building blocks being reusable at a system level register transfer level.

28. (Currently Amended) The ~~method~~ system of claim 12, the first and second Intellectual Property ~~electronic circuit~~ building blocks being reusable at a system level register transfer level.

29. (Currently Amended) The method of claim 20, the first and second Intellectual Property ~~electronic circuit~~ building blocks being reusable at a system level register transfer level.

30. (Currently Amended) The method of claim 22, the first and second Intellectual Property ~~electronic circuit~~ building blocks being reusable at a system level register transfer level.

31. (Previously Presented) The method of claim 1, wherein the interface can be automatically synthesized when data sequencing between the first and second signaling protocols differs.

32. (Currently Amended) The ~~method~~ system of claim 12, wherein the interface can be automatically synthesized when data sequencing between the first and second signaling protocols differs.

33. (Previously Presented) The method of claim 20, wherein the third representation can be automatically synthesized when data sequencing between the first and second signaling protocols differs.

34. (Previously Presented) The method of claim 1, wherein the interface automatically labels data referenced by the first and second signaling protocols.

35. (Currently Presented) The ~~method~~ system of claim 12, wherein the interface automatically labels data referenced by the first and second signaling protocols.

36. (Previously Presented) The method of claim 20, wherein the third representation automatically labels data referenced by the first and second signaling protocols.

37. (Currently Amended) The method of claim 1, wherein the interface is automatically synthesized between the first and second Intellectual Property ~~electronic circuit~~ building blocks within a computer.

38. (Currently Amended) The system of claim 12, wherein the interface is automatically synthesized between the first and second Intellectual Property ~~electronic circuit~~ building blocks within a computer.

39. (Currently Amended) The method of claim 20, wherein the third representation is automatically synthesized between the first and second Intellectual Property ~~electronic circuit~~ building blocks within a computer.